INPUT

[illegible] MARKET PERSPECTIVE

Database Migration

Europe

Market Analysis Programme – Europe

MAY 1993

DATABASE MIGRATION EUROPE

THE SKILLS BARRIER

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Abstract

This study presents an executive perspective on the adoption of and migration to new database management software technologies. It is based on the results of interviews with over 100 database managers across Europe.

The benefits of adopting standards at the level of database management software were very evident. However, the confusing number of choices in the market and the low investment in acquiring new technical skills are clearly barriers to the full exploitation of relational products.

Opportunities exist for both professional services and software product vendors to provide stronger support to in-house migration projects, improving the knowledge transfer of new relational working practices to IT specialists.

A case study is presented of the successful strategies of a large international European enterprise. The study also speculates on the types of vendors likely to take a lead in database products during the next decade.

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Table of Contents

I Introduction I-1

- A. Scope and Methodology I-1
- B. Profile of User Interviews—Database Management Respondents I-2
- C. Report Structure I-4

II Executive Overview II-1

- A. RDBMS Skills Shortage—Services Opportunity and Growth Barrier II-1
- B. Adoption of Standards Benefits this Large Enterprise II-3
- C. How Long Will the DBMS Vendors Remain Highly Valued? II-4

III Database Migration—Overcoming The Skills Barrier III-1

- A. IT Services Industry Slow to Exploit RDBMS Skills Shortage III-1
- B. Database Managers' Viewpoint III-2
  - 1. Migration to New Environments III-2
  - 2. Growth III-3
  - 3. Life Expectancy III-3
  - 4. Migration Experience and Advice III-3
- C. Impact on Professional Services Vendors III-4
- D. Impact on Software Products Vendors III-4

IV IBM's Natural Leadership Fades IV-1

- A. Business Changes IV-2
  - 1. New Legislation IV-2
  - 2. Financial Economies IV-2

Table of Contents (Continued)

IV

  - 3. Challenging Competitors IV-3
  - 4. Re-organisations IV-3
  - 5. Process Re-engineering IV-3
- B. Technology Changes IV-3
  - 1. Client/Server Architectures IV-3
  - 2. Commodity-Priced Hardware IV-4
  - 3. Information Engineering IV-4
  - 4. Multi-Media Data IV-4
  - 5. Object-Oriented Programming Software IV-4
  - 6. Open Systems IV-5
  - 7. Popular Software Packages IV-6
  - 8. Total Quality Initiatives IV-6
- C. Competitive DBMS Environment IV-6
  - 1. IBM and DB2 IV-6
  - 2. Other Mainframe Databases IV-8

V

Lessons in DBMS Migration Strategy V-1

- A. Lower Costs for New Applications V-1
- B. Case Study—A Distributed Data Warehouse Strategy V-2
- C. Selecting a Relational Database Management System (RDBMS) V-5
- D. Migration Problems and Advice V-8

Exhibits

I

-1 Profile of Respondents by Industry I-2
-2 Profile of Respondents by Country I-3
-3 Profile of Respondents by Number of End Users I-4

II

-1 Barriers to DBMS Success II-2
-2 DBMS Standards Benefit a Large Enterprise II-3
-3 Information Access—Potential Demand Evolution II-5

III

-1 Old Versus New IS Environments III-2
-2 DBMS—A Long-Term Investment III-3
-3 Professional Services Recommended for DBMS Migration III-4
-4 Potential Changes in Relative Market Shares of Database Technologies III-5

IV

-1 Rapid Changes Encourage IT Standards IV-2
-2 Types of Data to be Distributed IV-5
-3 Vendors Declaring Support for IBM's DRDA Standards IV-7
-4 Popularity of Mainframe RDBMSs, U.S.A., 1992 IV-9

Exhibits (Continued)

V

-1 Expected Changes in IT Budget Mix V-2
-2 Large Enterprise Data Warehouse Strategy V-3
-3 Benefits of Database Standards in a Large Enterprise V-5
-4 Ranked RDBMS Purchasing Criteria V-6
-5 DBMS Purchasing Criteria by Industry V-7
-6 RDBMS Migration Problems V-9

I

Introduction

This report is produced as one of a series of executive perspectives in INPUT's Software and Services Planning Services for the Computer Software and Services Industry in Europe.

The report is designed to assist vendors in assessing market opportunities and strategies that result from customers' migrating to new database software technologies.

A

Scope and Methodology

This report reviews and analyses the results of interviews with 104 IT managers with specific responsibility for databases—largely database managers.

The objective was to gain a full and detailed understanding of users' experience and expectations in the adoption of DB2 and other products, especially in migration/integration from one major database package to another.

To this end, INPUT has conducted interviews across Europe with appropriate IT executives. These interviews were based on a common questionnaire designed and tested specially to establish the key factors influencing the users of the database software in development and production environments. Face-to-face and telephone interviews were conducted.

Topics covered included:

- Databases adopted
- Confidence in vendors
- Usage and period of growth
- Adoption of corporate standards
- Impact of application packages
- Impact of contracted-out projects

- Experience of database migration:
  - Benefits
  - Problems
  - Advice to others
- Ranking of purchasing criteria

Some of the key findings were then discussed with leading database vendors in order to validate reactions.

In addition, INPUT's extensive library and database of information relating to the software and services industry was used.

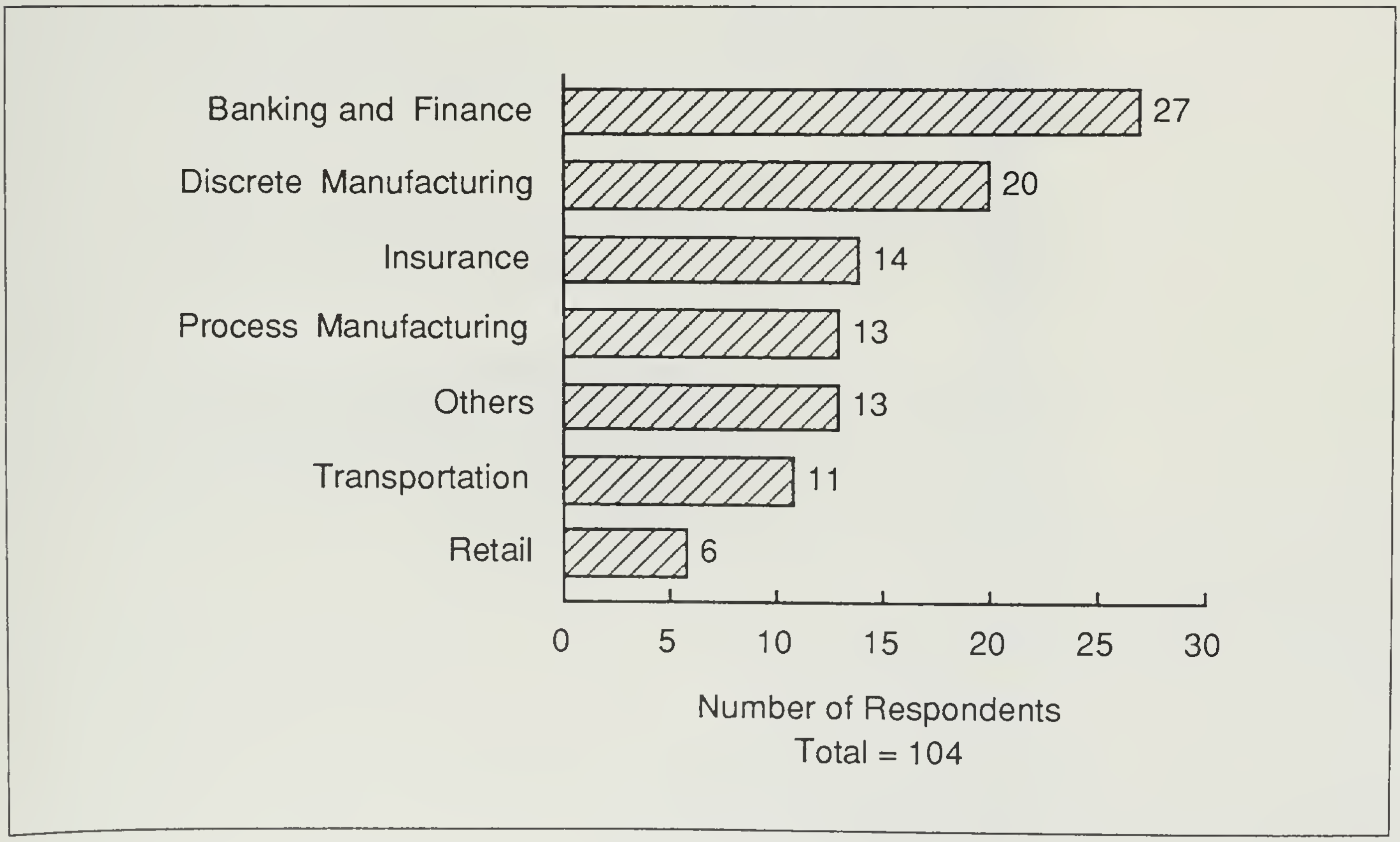
B

Profile of User Interviews—Database Management Respondents

Exhibits I-1 to I-3 provide a profile of the interviewees who contributed to the user research in this perspective. Respondents were 104 IT managers with particular responsibility for database management—typically, database managers.

EXHIBIT I-1

Profile of Respondents by Industry



The sample was dominated by IBM users; 73 used IBM (or compatible) mainframe or midrange systems and 46 used the DB2 database product. Software AG users numbered 15, followed by 14 IDMS users and 14 Oracle users.

Exhibit I-1 provides the split of respondents by industry sector. Exhibit I-2 shows the split by country. Exhibit I-3 shows the split by number of end users supported on the systems. Overall, the respondents provide opinions from a broad and representative cross-section of database managers.

EXHIBIT I-2

Profile of Respondents by Country

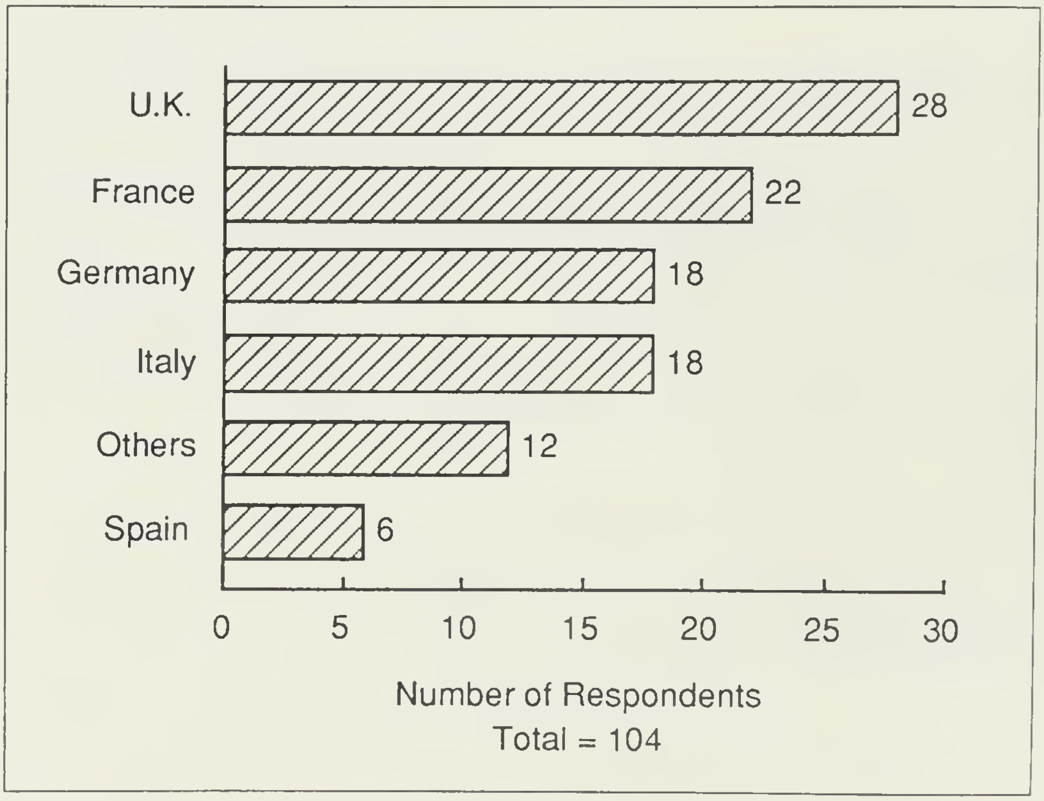
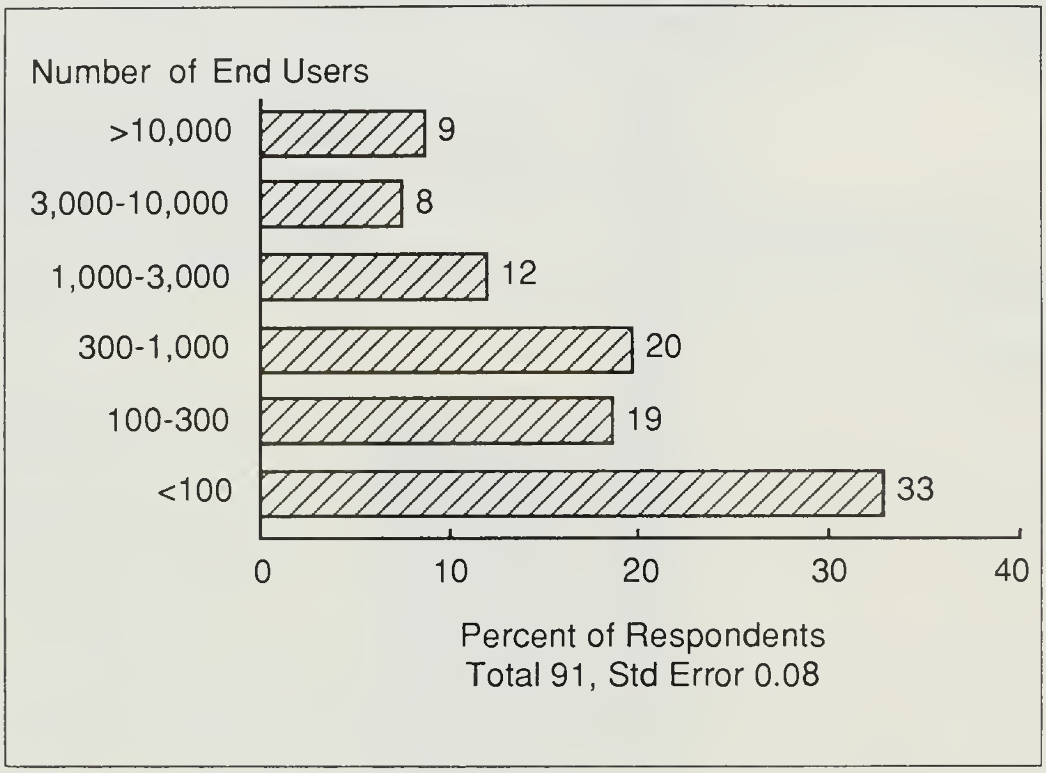


EXHIBIT I-3

Profile of Respondents by Number of End Users



C

Report Structure

The remaining chapters of this report are structured in the following way:

- Chapter II is an executive overview offering a concise summary of the conclusions of the report.
- Chapter III describes INPUT's assessment of the barriers to more rapid growth in the database software and services market.
- Chapter IV is a case study of a very large European enterprise which has been gaining advantage from a database standards strategy over the past decade.
- Chapter V describes INPUT's analysis of user experience in the migration from old to new database software.

II

Executive Overview

A

RDBMS Skills Shortage—Services Opportunity and Growth Barrier

Decisions to standardise on a new relational database technology do not come easily for IT management. The legacy of investment in older technology and the skills to maintain it often result in a deferral of decisions to migrate to more modern tools. When a decision is made it is very likely that not enough will be spent on acquiring the skills to exploit the new technology fully. Professional services vendors must offer more support services to in-house migration projects. RDBMS vendors need to provide more focus on the knowledge transfer of new working practices.

Concern about IBM's poor financial performance in the past year or two has left many customers floundering without clear direction. Looking (possibly for the first time) at alternatives to IBM there is a bewildering choice of DBMSs, 4GLs, CASE tools, methodologies, architectures, strategies and vendors. Despite the success of IBM's market-leading DB2 relational database, customers are looking hard at other vendors' strategies.

Those database managers with recent experience of migrating to a new standard RDBMS are quite clear that there were significant advantages in terms of flexibility, ease of use and speed of new application development. But many had underestimated the difficulties of converting existing data or of re-engineering applications. In particular, without prompting 30% mentioned training as the main area in which they had experienced problems.

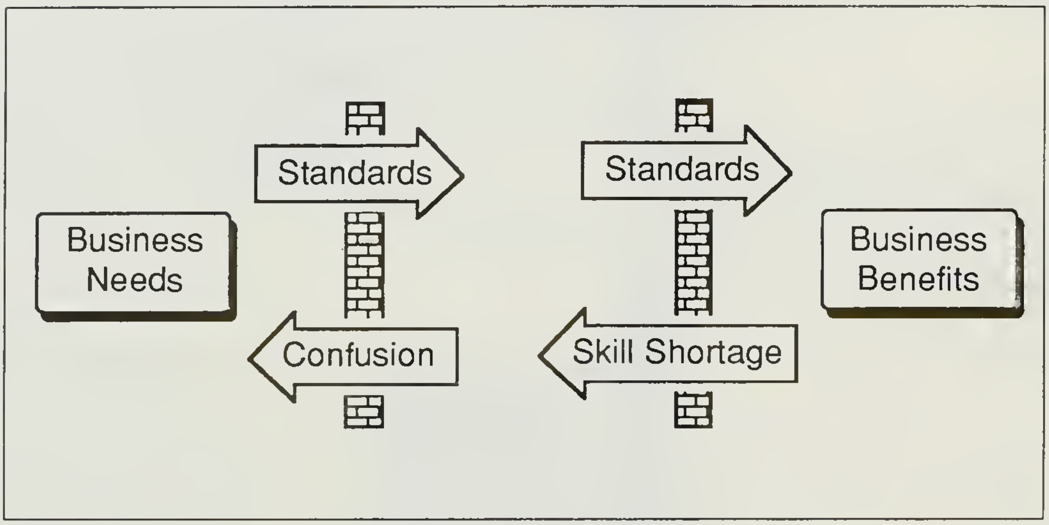
Although the adoption of standards, either proprietary or international, is clearly the route to maximum business benefits, the two main barriers—as illustrated in Exhibit II-1—are:

- Confusion over which standards to adopt—for example, should it fit a client/server or an open systems architecture?

- A shortage of suitably skilled staff, either retrained in-house, recruited, or contracted in from a services vendor

EXHIBIT II-1

Barriers to DBMS Success



Professional services vendors tend to focus their activities on carrying out projects for customers or supplying key staff on contract. To grasp the opportunities related to migrating and implementing systems based on new technologies, they should also:

- Seek opportunities to provide more independent advice to clients on the adoption of "standards" within their IT strategy
- Identify and develop their own core competencies in new software platforms and design methodologies
- Market these not only as a capability to implement on behalf of the customer but also as an ability to transfer this competence to the customer's own staff

Vendors of RDBMSs and similar key technologies treat the training of client staff as a natural consequence of selling their software products. Much training is oriented to learning about a specific product. There is a larger opportunity to train in the successful application of RDBMS technologies, which requires these vendors to:

- Focus on education and training services, which build up experience of good application, design and development working practices, rather than just impart product knowledge
- Offer services specifically aimed at migration and integration issues, as these affect a large percentage of users

B

Adoption of Standards Benefits this Large Enterprise

An analysis of the database strategy of one very large international enterprise reveals a surprising number of benefits arising from standardisation. Over a period of ten years, this company has moved from a wide variety of locally developed systems across numerous regional data centres to a set of standard core applications supported from one-tenth the number of centres. Exhibit II-2 summarises the benefits derived.

EXHIBIT II-2

DBMS Standards Benefit a Large Enterprise

- Scalable duplicate applications
- Data centre consolidation
- Improved customer information
- Efficient in-house development
- Minimised duplicate efforts
- Real-time executive information

The initial task was to produce standard customer-facing applications which would run at all data centres, whatever their configuration. Once that was achieved it became possible to concentrate their operation at far fewer sites, producing significant cost reductions. Costs were dramatically reduced and customers had far better access to information.

Data warehouse concepts—accepting that there will always be a disparate set of databases from different vendors—have been applied to give end users access to critical management information. The core transaction databases are copied daily into relational systems for this purpose. Rapid application development (RAD) is undertaken using modern relational tools and methods, even though the core systems use older technology.

Proliferation of departmental and personal systems around these central systems had led to many end-user departments developing their own applications. Maintenance and duplication became cost issues. Such staff have been transferred back to a central IT resource from which shared applications are supplied.

The ability to access such a variety of systems has enabled a powerful EIS (executive information system) to be implemented. It is used by members of the main board to keep track of the company's operational business position and also supplies news about key customers, suppliers and competitors.

C

How Long Will the DBMS Vendors Remain Highly Valued?

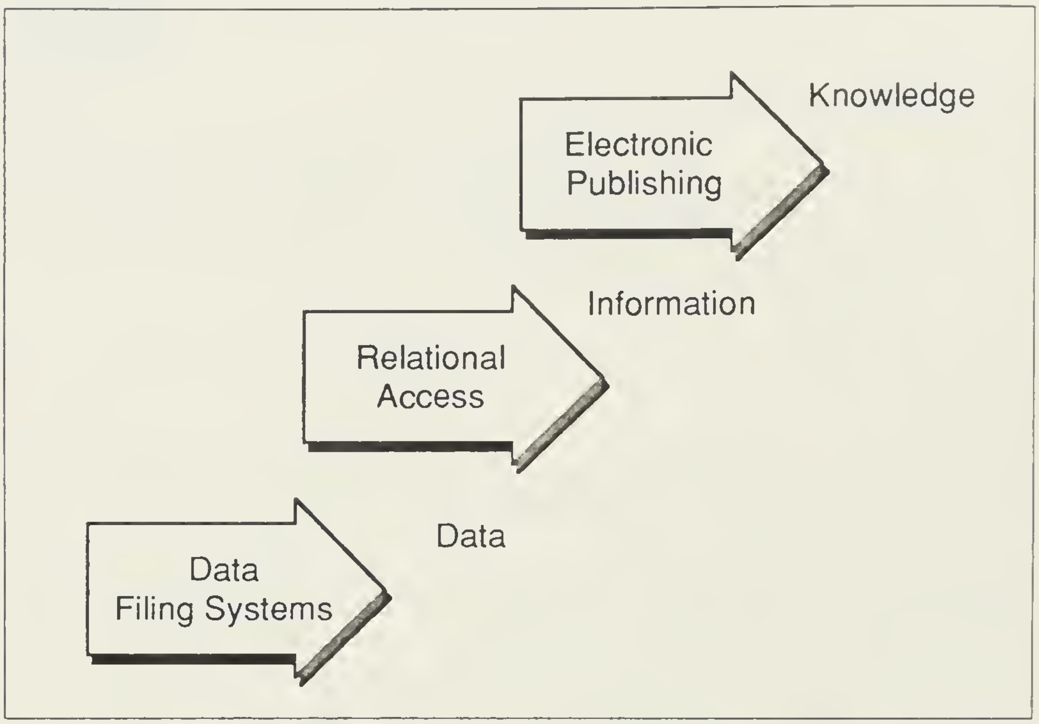
Products from relational database management vendors have emerged over the past decade as the key technological platforms for complex information systems. Their importance has grown largely at the expense of the proprietary hardware platforms. The requirements for preferred standard platforms has moved from hardware through operating systems to development environments—now largely based on some database technology with 4GLs and CASE tools.

End users have welcomed far greater ease of access to computer-held databases through innovations such as SQL, query-by-example and GUI interfaces. Relational databases are now threatened by the arrival of object-oriented techniques and multi-media applications. But it is possible that this is all just a transitional phase, where the real requirement is not for good general-purpose software tools, but for information that is packaged directly for the user. The end need is not for software but for information.

The concept of demand turning from software to information—published electronically—is suggested in Exhibit II-3. The next decade is likely to see the strong emergence of yet another group of vendors—selling information databases. Just as the RDBMS vendors have displaced the hardware manufacturers as adding key value, so the electronic publishers may well displace the software vendors of today.

EXHIBIT II-3

Information Access
Potential Demand Evolution



In the end it is not just data that end users need. Even information is only part of the story. What is really needed is knowledge, and the packaging of knowledge could be the role of the electronic publishers of the future.

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III

Database Migration—Overcoming the Skills Barrier

A

IT Services Industry Slow to Exploit RDBMS Skills Shortage

Relational database technology has become established as the technology of choice for nearly all new database applications. But there is still significant hesitancy to invest because of the high transitional cost of migration and the bewildering choice of DBMS products, strategies and vendors. Both software product and professional services vendors have undervalued the opportunity to support clients in the migration process.

During recent interviews with database managers across Europe, INPUT found clear evidence of underinvestment in training when adopting new database technologies and changing working practices. It was also evident that the adoption of standards, whether open or proprietary, produced significant benefits. Not least, it reduced confusion and hesitancy in implementing new information solutions.

The investment legacy in database management systems and the wide choice of new DBMS environments now available has left some IS managers hesitant about investing in migration to the new technologies. Just when relational databases have become the popular choice, the industry is now creating excitement with object-oriented and multi-media databases. But INPUT's research shows that IS management expects any new database standard it adopts to typically grow in usage for seven years or more—presumably creating the next set of legacy systems. Is this a reasonable expectation?

This chapter analyses the main barriers to more rapid adoption of new database technology in the European market, summarises the experience of those who have recently migrated to relational products and recommends actions for vendors.

The central issue is for IS management to make decisions on product standardisation and to receive support from product and service vendors in doing so.

B
Database Managers' Viewpoint

The following paragraphs summarise the perspective of database managers in relation to their experience in adopting new relational databases.

1. Migration to New Environments

Despite the transformations occurring in both business and technology, in many ways database managers are still addressing the same old needs:

- Establishing common data definitions and standards across the organisation or enterprise
- Maintaining agreed levels of data integrity and confidentiality
- Ensuring that users can get timely access to information

But the business and technical environment in which they are operating is undergoing major changes. Not least are those due to architectural improvements as the focus for IS moves from the central computer to the desktop. Exhibit III-1 summarises the most obvious changes occurring as IS moves from traditional environments towards new networked client/server concepts.

EXHIBIT III-1

Old Versus New IS Environments

Traditional	Downsized
Mainframe	Client/server
Shared	Dedicated
Remote	Local
IS Operated	User Operated

How readily can a specific DBMS be adopted as a standard? Forty percent of the database managers interviewed by INPUT feel there is no problem in adopting a DBMS as a corporate standard. Most of these had a group management decision successfully imposed on them. This leaves 60% who found it difficult to overcome the obstacles such as complexity of and investment in existing systems.

2. Growth

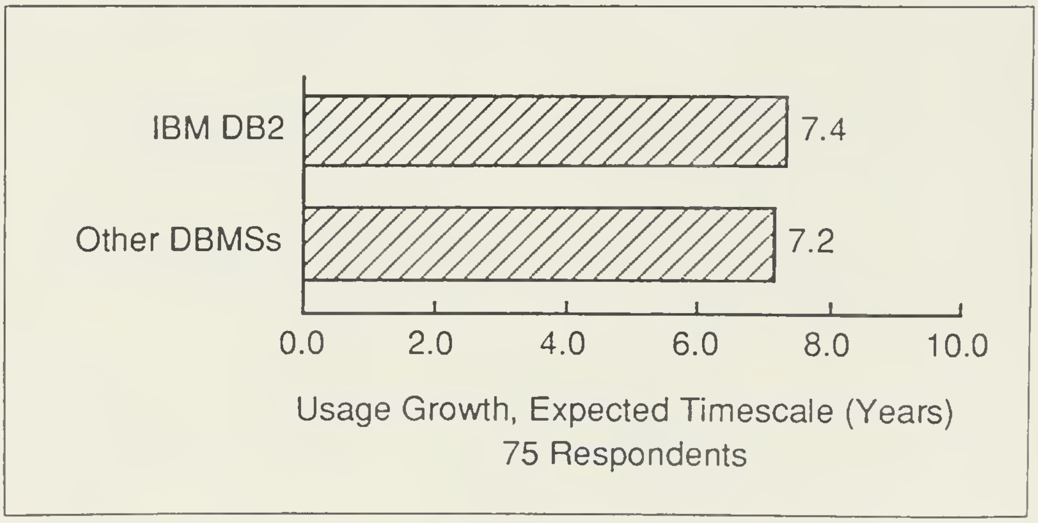
The number of end users supported by an operational DBMS averaged 2,400. Managers of DB2 systems reported a larger average of over 4,000 end users. Expected growth in the number of users over the next five years was 13% CAGR (compound annual growth rate).

3. Life Expectancy

A database management system is a major long-term investment, especially in a mainframe environment. Exhibit III-2 shows that respondents predict over seven years' growth in usage—presumably followed by many years of continued operation before the system is eventually replaced.

EXHIBIT III-2

DBMS—A Long-Term Investment



4. Migration Experience and Advice

In summary, the migration problems experienced by database managers are familiar: project over-running, lack of skilled staff, should have planned in more detail, should have chosen a less critical project, etc. This topic is expanded upon in Chapter V.

It seems that the complexity of moving from non-relational to relational techniques is being underestimated. What does this imply for the vendors? The industry is failing to respond to this latent demand.

C

Impact on Professional Services Vendors

Basically, customers have a strong tendency to underinvest in the skills necessary to successfully implement new relational DBMSs. This presents special opportunities for service vendors who have a pool of the necessary skills and the track record in the staff development required in such migrations. Exhibit III-3 identifies the wide range of different skills for which INPUT has identified demand.

EXHIBIT III-3

Professional Services Recommended for DBMS Migration

- Staff training
- Specialist consultancy
- Development project
- Migration support
- Integration project
- Software maintenance
- Systems operations

INPUT recommends that professional services vendors package these services to address specific RDBMS environments as an aid to system transition and migration. In all cases the objective is to support the customer in becoming self-sufficient in application development using the new technology.

D

Impact on Software Products Vendors

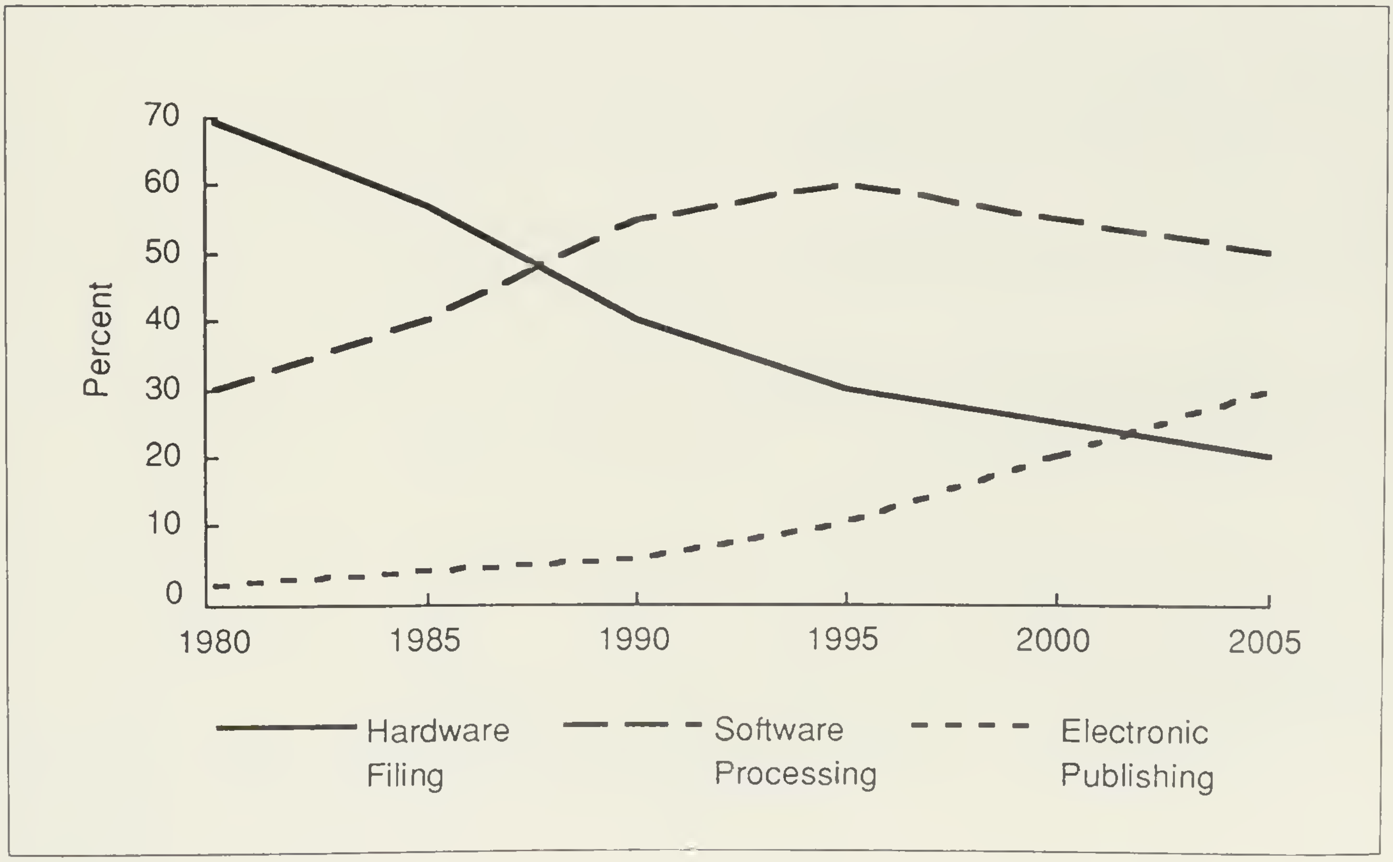
Many of the RDBMS vendors offer a range of supporting services similar to those listed in the above exhibit. The product vendors interviewed by INPUT all treat customer training and other support services as a follow-on to a product sale. This compares to some system vendors who now see education, training and consulting almost as part of their marketing and public relations function, encouraging demand for their products.

INPUT recommends that software product vendors strongly market education and training services that transfer "best practice" knowledge to customers. It is in the application of these new technologies to information systems that IS managers are underinvesting. For a subject like relational databases, product training is perhaps less than half of the skill required. Much more essential is the understanding of how best to apply the technology to actual information management problems.

The RDBMS vendors focus on advancing their technology. It is possible that database management products, currently enjoying a large and growing marketplace, will soon begin to lose market share to vendors of information. Exhibit III-4 forecasts a potential change in future user demand, already visible in the growth of on-line and CD ROM information sources.

EXHIBIT III-4

Potential Changes in Relative Market Shares of Database Technologies



The exhibit shows the changing relative importance of:

- (Hardware) filing systems—inflexible hierarchical systems for accessing data via complex applications with a focus on crude performance
- Software processing—relational flexibility supporting ad hoc end-user access with a focus on ease of use and simple application development
- Electronic publishing—where the product and focus is the information rather than the means to process it, rather than any software or application

The transition between these phases of end-user expectation may result in more power struggles between vendor groups. Already the RDBMS vendors have assumed pole position in the server market, replacing traditional user preferences for hardware vendors. Some vendors, such as Lotus, Reuters and Sony, see the electronic information publishing business as the market in which users will ultimately see the maximum value when it comes to databases.

IV

IBM's Natural Leadership Fades

No one doubts that we are experiencing a period of unprecedented rapid change. The 1992 losses announced by IBM indicate that it has been unable to keep up the pace, although many younger vendors are still building their revenues very rapidly. What effect is this sea-change in the IT industry having on IS departments and their use of database software? For some, it brings uncertainty and doubt. It allows others to exploit IT to the benefit of their businesses more than ever before.

There are two strong influences on the behaviour of IS functions: changes in the business environment they serve, and changes in the IT environment that serves them. Both are moving rapidly. Both are examined in the following pages.

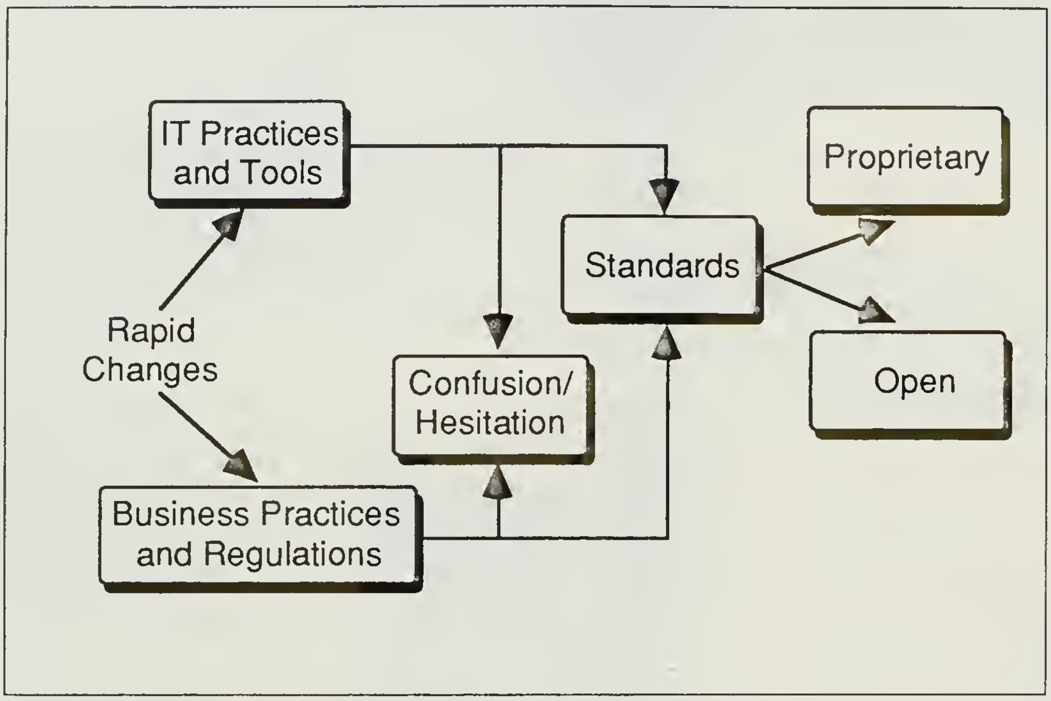
INPUT's research indicates that this pressure for change is dividing the IS management into two camps, illustrated in Exhibit IV-1:

- Those who have chosen a set of "standards" on which to build their IT/database strategy, and now can invest in gaining critical mass in terms of skills and software resources. The "standards" they choose can be either proprietary products or international standards.
- Those who have yet to adopt "standards" and remain bemused and confused by the huge variety of paths they might follow

The benefits to be gained by having a set of standards for DBMS environments seem to far outweigh any benefits of retaining an independent position. Even those who have had a corporate standard forced on them "by management" have enjoyed the benefit. It would seem that "any standard is better than no standard."

EXHIBIT IV-1

Rapid Changes Encourage IT Standards



A Business Changes

There is no shortage of environmental pressure to change for today's businesses and government organisations.

1. New Legislation

Europe is trying to become a more coherent and open market under the guidance of the European Commission. Every branch of industry, commerce and infrastructure has been shaken up by new legislation and trading guidelines aimed at minimising national barriers to business within the European Community. There are also national initiatives either re-regulating or de-regulating certain sectors.

As just one example, the Italian banks are experiencing such a continuous flow of changes in regulations that it is a major concern to IS managers who have to constantly modify their computer systems. At the same time, they are responding to the need to improve responsiveness to customers at local branches through networked information systems.

2. Financial Economies

It is difficult to find an IS manager who is not working with a restricted budget at a time when Europe is feeling the full effects of global recession.

3. Challenging Competitors

The key role of IT in industry cycles around fairly predictable phases related to business objectives such as: reduce costs, improve productivity, speed introduction of new products, and enhance customer service. Often a whole sector can be judged to be at a particular point on this cycle. For example, the insurance sector has passed through the new products phase and has reached the cost reduction phase. Companies are either responding to moves by their competitors or are challenging their competition with innovative exploitation of IT.

4. Re-organisations

Rationalisation and re-organisation, disposals and acquisitions can destroy the IT standards policy of a company. In an extreme example, a few years ago a merger between two leading U.K. building societies in property mortgages was actually called off after a review of the difficulties of integrating their huge but incompatible IT systems.

5. Process Re-engineering

For management consultants the hot topic is business re-engineering. This is the name given to re-engineering basic business processes in order to position a company to better meet market opportunities and competitive threats. Just as it applies to all the normal line functions within a business, so it can (and often needs to) be applied to the IS function itself.

The re-engineering of IS departments is probably the most challenging task facing the IT community this decade. If business is to fully exploit new information systems technology, IS departments will have to learn many new skills and develop working practices appropriate to the fast-changing business environment they need to serve.

B

Technology Changes

There has been no slackening in the pace of change in new IT products. The following major technological changes impacting the IT users and their suppliers is reminder of just how complex the IT environment is becoming.

1. Client/Server Architectures

Client/server architecture is rapidly being accepted in the market as a preferred software development environment, and portable applications are introduced by nearly every major and minor software vendor.

2. Commodity-Priced Hardware

Hardware pricing reflects the very large volumes of computer sales and their standardised specifications. This has been the main driving force for a re-evaluation by vendors and users alike of exactly where the value lies in a computer system. The usual answer is in software and services.

3. Information Engineering

In various forms, IE has been widely adopted as a means of introducing formal working practices into the rather ad hoc world of information flow, databases, systems and software through their design, production, delivery and support.

4. Multi-Media Data

The technology for multi-media data is readily available, though database technology still treats large objects as a kind of special case. Applications are emerging slowly that are expected to convert the data processing past of numbers and words into a future that can deliver richer forms of information.

IBM's recent financial difficulties have surprised some of its database customers as well as shareholders. At the same time, it has been rapidly switching its business focus from hardware products to software, professional services and systems integration in Europe. This has left more than one user asking, "What is happening to IBM?"

In the past the patriarchal attitude of IBM towards its customers gave most the feeling that they were in safe hands. If IBM said this was the direction to go, then there was a very good chance that it was. This leadership role of IBM has slipped. Although there are still many customers who see the 1992 losses as a "short-term difficulty," others have now been encouraged to seek advice elsewhere and are starting to face a bewildering array of choices. This is especially true for database management software.

Even IBM itself has both recognised this diversity and contributed to its continuance. The Information Warehouse concept IBM now promotes is aimed at supporting access to a mix of systems from different vendors—practically all large IS sites inevitably have a legacy of such disparate systems.

5. Object-Oriented Programming Software

OOPS promises to make software re-usable to a far greater extent than before, though this is a promise also made for previous "innovations" such as structured programming.

Growing complexity is the future for DBMSs. The types of data to be distributed are increasing in number all the time, as Exhibit IV-2 illustrates.

Managing the data as objects is one thing that most vendors are now offering. Providing application-level access to object-oriented software is a entirely different level of complexity and is a challenge that may change the face of database management over the next five to ten years.

6. Open Systems

The open systems movement has resulted in the majority of European organisations with an IT investment moving applications onto downsized hardware platforms. The trend will continue.

EXHIBIT IV-2

Types of Data to be Distributed

- Records:
    - Accounting
    - Inventory
    - Sales
- Text:
    - Notes
    - Letters
    - Documents
- Voice:
    - Messages
    - Annotations
    - Audio Response
- Graphics:
    - Charts
    - Maps
    - Drawings
- Images:
    - Facsimile
    - Video
    - Pictures
- Other:
    - Programs
    - Knowledge Rules
    - Metadata

Just when the industry seemed to be moving towards standards such as fewer operating systems, vendors looking for market share are inevitably still increasing the choice of products available. Open systems have encouraged open competition. But it has also led to some IS management becoming totally confused about how to make longer term decisions.

7. Popular Software Packages

The widespread adoption of software packages, the majority now based on Microsoft Windows, is forcing IS management to re-evaluate how, and whether, they should continue to develop software in-house—or even under contract.

8. Total Quality Initiatives

Around 70% of an IS department's creative time is spent looking after the maintenance of operational software, which is usually developed over a period of many years. Improvements in the quality of the whole system's implementation and maintenance processes are now being attempted using TQM working practices.

C

Competitive DBMS Environment

The technical background to the complex migration environments most commonly occurring in INPUT's research is provided below.

1. IBM and DB2

DB2, launched in the mid-1980s, is IBM's flagship database management system for its mainframes. It replaces older non-relational products VSAM, DL1 and IMS. IMS Fastpath might still be offered for a very high availability application, but DB2 is IBM's preferred product for the vast majority of systems—it is only available on mainframes under MVS.

Information Warehouse—called by critics IBM's "galactic" architecture—describes the future distributed processing strategy IBM has adopted with SAA/SNA, integrating access to IBM's four different database products on the four platforms: ES 9000, AS/400, RS/6000 and PS/2.

For nearly five years IBM has actively pursued a policy of buying strategic minority shareholdings (now estimated at over 1,000 vendors worldwide). These are both global and local initiatives supporting either emerging new technology (e.g., Information Warehouse from Information Builders), or application products, or supply channel partners. In addition, IBM has more conventional alliances through trading and marketing agreements and joint ventures.

For example, the software vendors who have announced their support for the DRDA (Distributed Relational Database Access) standards include the vendors listed in Exhibit IV-3.

EXHIBIT IV-3

Vendors Declaring Support for IBM's DRDA Standards

- Borland International
- Brownstone Solutions
- Cincom Systems
- Computer Associates
- DataEase International
- Enfin Software Corp.
- Fortis Development Corp.
- Gupta Technologies
- Information Builders
- Informix Software
- Intelligent Environments
- Locus Computing
- Micro
- Decisionware
- Must Software International
- Novell
- Object Technology International
- Open Books
- Oracle
- Sterling Software
- Sybase
- XBD Systems

SQL/DS is a less complex relational offering for mainframe applications under VM/VSE. SQL/400 is the relational product for the AS/400. OS2 Database Manager is the relational product for the PS2. A portable open version of Database Manager is being implemented on AIX for the RS/6000 and other UNIX computers, possibly also to include AIX on the mainframe.

IBM's Information Warehouse (IW) strategy provides a route map for accessing and linking data on all four of IBM's relational databases using the DRDA architecture. Its primary partner, Information Builders, offers EDA/SQL, which maps SQL across 40 different proprietary database products. IW addresses the issue of information quality across diverse distributed systems. Research in the USA indicates poor IS acceptance of the enterprise architecture proposed by IW.

IBM has fostered a wide range of software vendors to add value to its DB2 product line. IBM's National Solution Centres provide an on-line database of third-party software, both applications and tools. Some vendors have a special status with international marketing agreements which are ratified locally in each country (e.g., Candle, BMC, etc.). But most just have the opportunity to enter details of their products on this database.

Although IBM is to introduce a version of AIX and POSIX conformance for the mainframe, it is only doing so in response to competitive moves by Amdahl and Fujitsu and pressure from European governments. IBM has no clear role for UNIX on a mainframe in its IW or SAA plans. However, for its RS/6000 business, IBM is expected to become more aggressive and to offer software to run on other vendors' computers. This will be part of its strategy to gain leverage on other vendors' customers and increase its software revenues. DB2 is not part of this plan.

IBM invented SQL. Its slow development as an international standard resulted in a large group of software vendors forming the International Software Association (IBM did not join) to propose and agree on extensions and improvements. This ISA has now also lost impetus due to lack of funds as market conditions toughen.

The DRDA standards set by IBM have been adopted widely by vendors wishing to participate in IBM's distributed database market. There seems to be no prospect for these to become international standards. An Information Warehouse centre of excellence is being established in each country to support customer and third-party developments.

IBM is moving towards offering customers a single point-of-contact for all support services (pre-sale, implementation and maintenance) through its customer service organisation.

2. Other Mainframe Databases

A 1992 survey in the USA by *Computerworld* magazine compared user ratings for the six most popular mainframe RDBMSs. The users ranked Software AG's ADABAS first for the second year. Users rated their own software on a scale of 1 to 10 in fifteen specific categories. The results summary is given in Exhibit IV-4.

Oracle was one of the first vendors to produce a relational database that met IBM's relational definitions. Oracle's aggressive marketing over the past decade has given it a clear lead in hardware-independent RDBMSs, especially on Digital and UNIX computers. Although Oracle has been heavily criticised for the poor performance of its products, it seems to be leading the way in adapting software to take advantage of the new generation of massively parallel processor architectures.

CA-Datacom and IDMS from Computer Associates have taken the route also followed by Software AG's ADABAS in adding SQL to an old database structure to meet relational demands and porting the product to desktop and UNIX operating systems.

Supra from Cincom is available across a similar range of operating systems, but the company has yet to re-establish its financial credibility. The product technology has been well received by critics, but it is too early yet to judge its success.

EXHIBIT IV-4

Popularity of Mainframe RDBMSs, U.S.A., 1992

Rank	Product	Score 100 Max	Loyalty (%)	Highest Ratings	Lowest Ratings
1	ADABAS	78	95	Vendor service & support System availability and recovery	Useful SQL extensions Support for standard SQL
2=	Oracle	76	96	Support for standard SQL Useful SQL extensions	Vendor service & support Performance and systems monitors
2=	CA-Datacom	76	80	System availability and recovery On-line transaction processing performance	Integration of CASE tools Performance and systems monitors
4	IBM DB2	73	97	Effective programming tools System availability and recovery	Performance and systems monitors Integration of CASE tools
5	Cincom Supra	72	70	System availability and recovery On-line transaction processing performance	Performance and systems monitors Distributed updating and recovery
6	IBM SQL/DS	71	78	Support for standard SQL Distributed updating and recovery	Performance and systems monitors Effective end-user tools

Source: *Computerworld*, 17 August 1992

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V

Lessons in DBMS Migration Strategy

Chapter I gave the profile of database managers interviewed on the topic of migration in Europe. This chapter describes the most relevant findings.

A

Lower Costs for New Applications

The dominant view of database managers is that they expect to decrease their spending on application products and on both in-house and external development projects. Exhibit V-1 shows the analysis of responses. These changes would result in an increase in expenditure on other areas such as systems software products, equipment, and software maintenance.

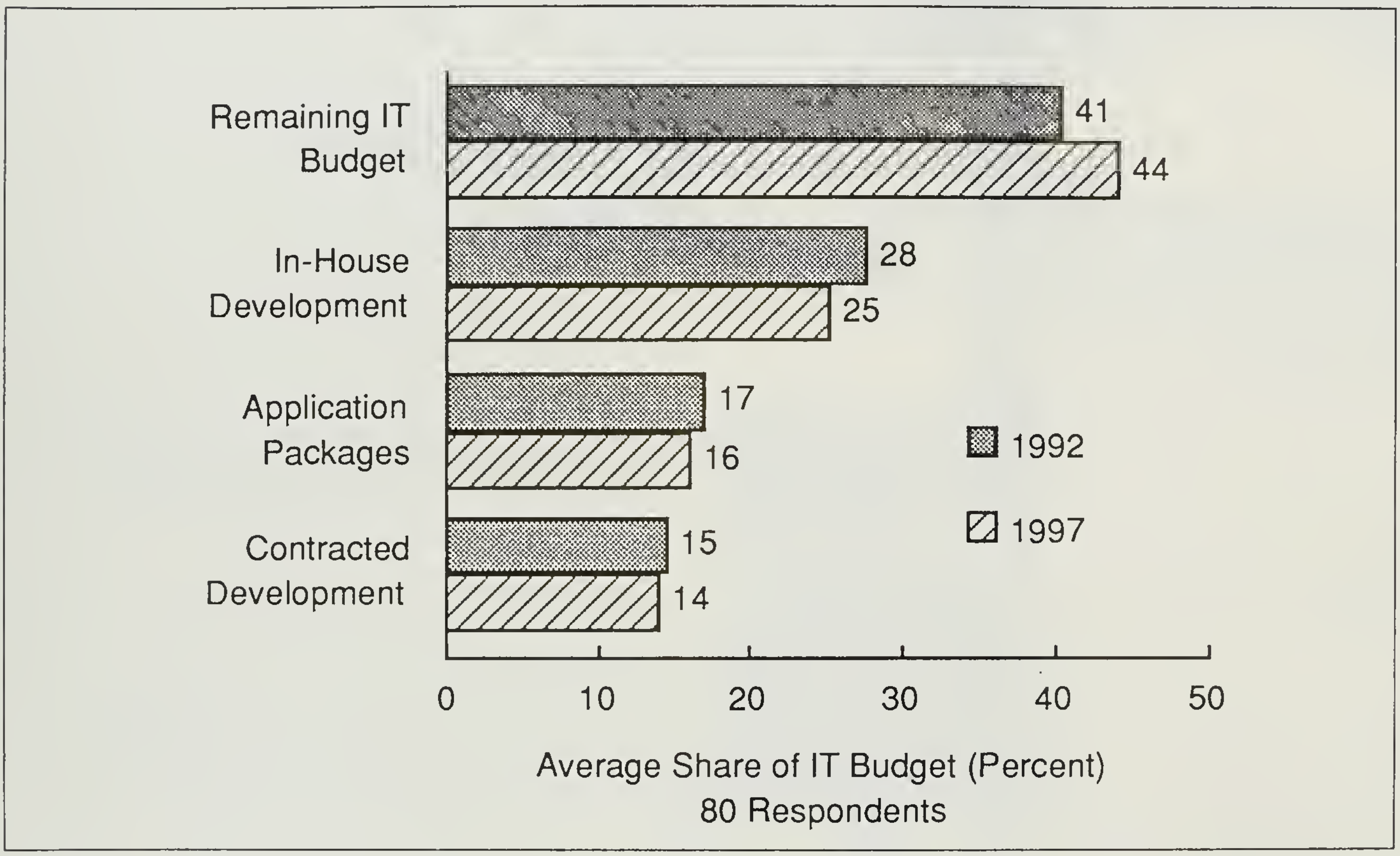
The key message is that when these managers are under pressure to reduce the costs and time scales of new developments, they do not naturally consider increasing their spending on applications software products. They only think of other ways to improve development productivity.

There is a strong body of opinion in the IT industry that it is the customer's requirement for applications which now drives the selection of platforms on which to run them. If the customer has a need for an order processing application, then he should select the best fitting offering and buy the software and hardware platforms that give the best value for money. In most cases there will be no choice of software platform—especially the database software—it will be mandated by the environment for which the application package was developed. The software platform may then be supported on a variety of hardware platforms.

The way that application requirements lead to selection of a package and then on to a limited range of software and hardware platform options seems to parallel the need to make IT investments more closely match business requirements.

EXHIBIT V-1

Expected Changes in IT Budget Mix



However, database managers interviewed by INPUT expected that choice of an application package would take precedence over choice of database software in only 20% of cases today, rising to only 22% in five years.

There is obviously still a strong lobby for retaining more control and standardisation for the software environment. Does this imply that application packages will largely be selected for the database and operating systems they support? Or does it mean that the software tools now available will encourage a revival in the development of custom software? The following case study shows how some IS departments can still readily justify the expense of in-house or custom applications.

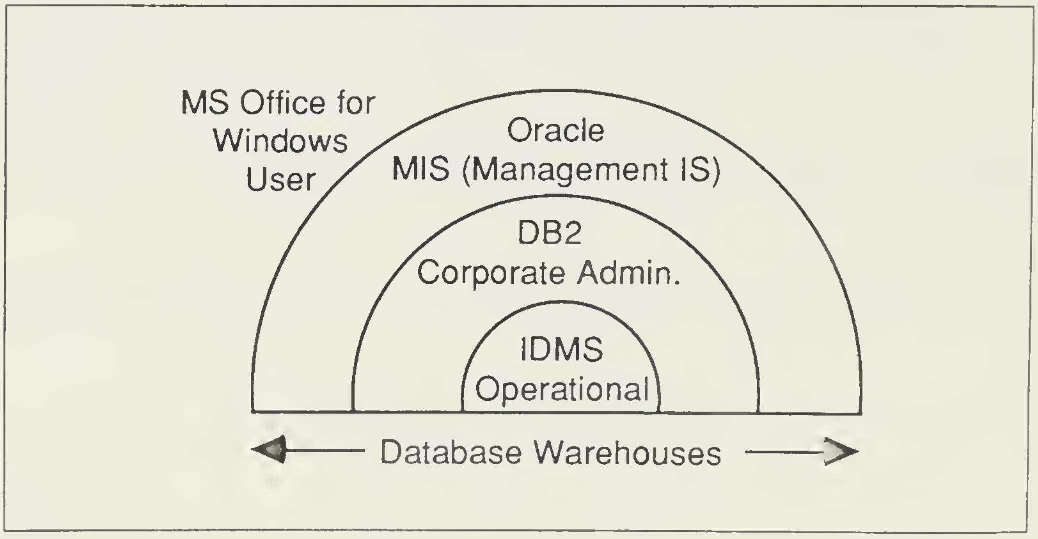
B
Case Study—A Distributed Data Warehouse Strategy

This very large European enterprise is highly dependent on IS systems for delivering its products and services globally. A very large transaction processing workload supports large numbers of national and several international branch/district operations. Over the last ten years the company has been enhancing management information systems and desktop applications. At the same time, it has improved its responsiveness to customer enquiries while cutting the costs of its data centres. For reasons of commercial confidentiality this organisation remains anonymous.

The concept of data warehouses is becoming well established in this enterprise. Exhibit V-2 shows the relationship between different applications using operational data held in the data centres. Data is copied daily from the IDMS-based transaction processing systems into the DB2 systems for relational access by major corporate applications. To make this data available to departmental and personal users requiring management information (via MISs), it is accessed via Oracle software rather than IBM. Oracle is reported to offer greater flexibility in accessing the DB2 databases, and is available across a wide range of hardware platforms, from PC through UNIX to mainframe.

EXHIBIT V-2

Large Enterprise Data Warehouse Strategy



The company has been consolidating its data centres, reducing the number of locations by a factor of ten in order to reduce operating costs and concentrate skills. In addition, it has been distributing applications that access these data centres to departmental and personal systems.

In 1992 the company standardised on Microsoft Office for Windows for use at the desktop. Migration to 386 PCs is under way, but needs case-by-case supporting business justification for each purchase by a local user department. Central purchasing of PCs is encouraged (but not enforced) by a supply and support deal which includes fully configured pre-loaded software: MS office, Windows 3.1, and DOS 5. A portfolio of standard software is available from a central purchasing authority.

Desktop requirements were previously an unplanned and uncontrolled expenditure. Now they must be justified within each business programme.

Some of the emphasis on standards has to do with maximising the benefits of IS training. Personnel policy promises two weeks of training per development or procurement employee per year. In software development areas it is currently more like 20% of staff time (perhaps too much?) as they push towards rapid application development (RAD) techniques. Developments are always centred on benefits to the business and commercial requirements.

Most applications software is now developed in-house. Even the accounting system, which was purchased a few years ago, is being replaced with an in-house development. The IS function feels this is justified because it has such a large number of captive customers for its software within its own business. In a way it behaves as a captive software products vendor within its own business, delivering to a large number of distributed operations.

Much of the software development used to be done by individual departments, using their own staff to write 4GL-style applications for local use. This type of development is now being discouraged, as it created a great deal of duplicated work, and the ongoing maintenance workload also escalated. Commonly used applications are now developed more centrally, moving IS staff out of non-IT departments, and limiting users to the use of standard Windows applications.

The use of this Windows strategy is seen as especially good at reducing the need for user training, as user application interfaces are all very similar.

To gain full advantage of the hierarchy of information databases within the business, an EIS (executive information system) has been implemented for the management board. It includes working modules for:

- Financial Reports - the Finance Director uses a linked PC in his review meetings with the Managing Director
- Quality of Service data - performance statistics
- Personnel and Pay Award information - for review of anomalies
- Service Reports and External News - includes news on key products, suppliers, competitors and clients
- Delivery Status - real-time report on the whole worldwide business, incident reports and daily performance

Exhibit V-3 highlights the main benefits of database standardisation within this organisation.

EXHIBIT V-3

Benefits of Database Standards in a Large Enterprise

- Consistent sets of regional applications
- Lower cost consolidated data centres
- Improved customer and management information
- Maximum return on in-house development
- Minimise duplicated local developments
- Real-time executive information for decision support

In summary, it can be seen that adoption of (a variety of) database standards has maximised the efficiency and effectiveness of the IT investments of this very large enterprise. These include:

- Introducing a consistent standards suite of core applications to replace a variety of inconsistent old applications
- Reducing IS costs further by then shrinking the number of data centres
- Improving data access with networked relational technology and the database warehouse concept
- Maximising competitive advantage with in-house software development and purchasing application packages only at the PC level
- Reducing duplicated development by centralising departmental application development and promoting continuous training
- Providing management with very current information on the company's position

C

Selecting a Relational Database Management System (RDBMS)

Among the European database managers interviewed there was considerable consistency in their key selection criteria if purchasing an RDBMS. Excluding intangible criteria such as the personality of the salesman, Exhibit V-4 ranks the key tangible characteristics that are considered important.

Database performance, compatibility with existing databases and the reputation and financial status of the vendor achieved highest scores as the three most important criteria.

Once again, the availability of applications packages scores very low in priority, with only 19% considering it important when selecting database software.

EXHIBIT V-4

Ranked RDBMS Purchasing Criteria

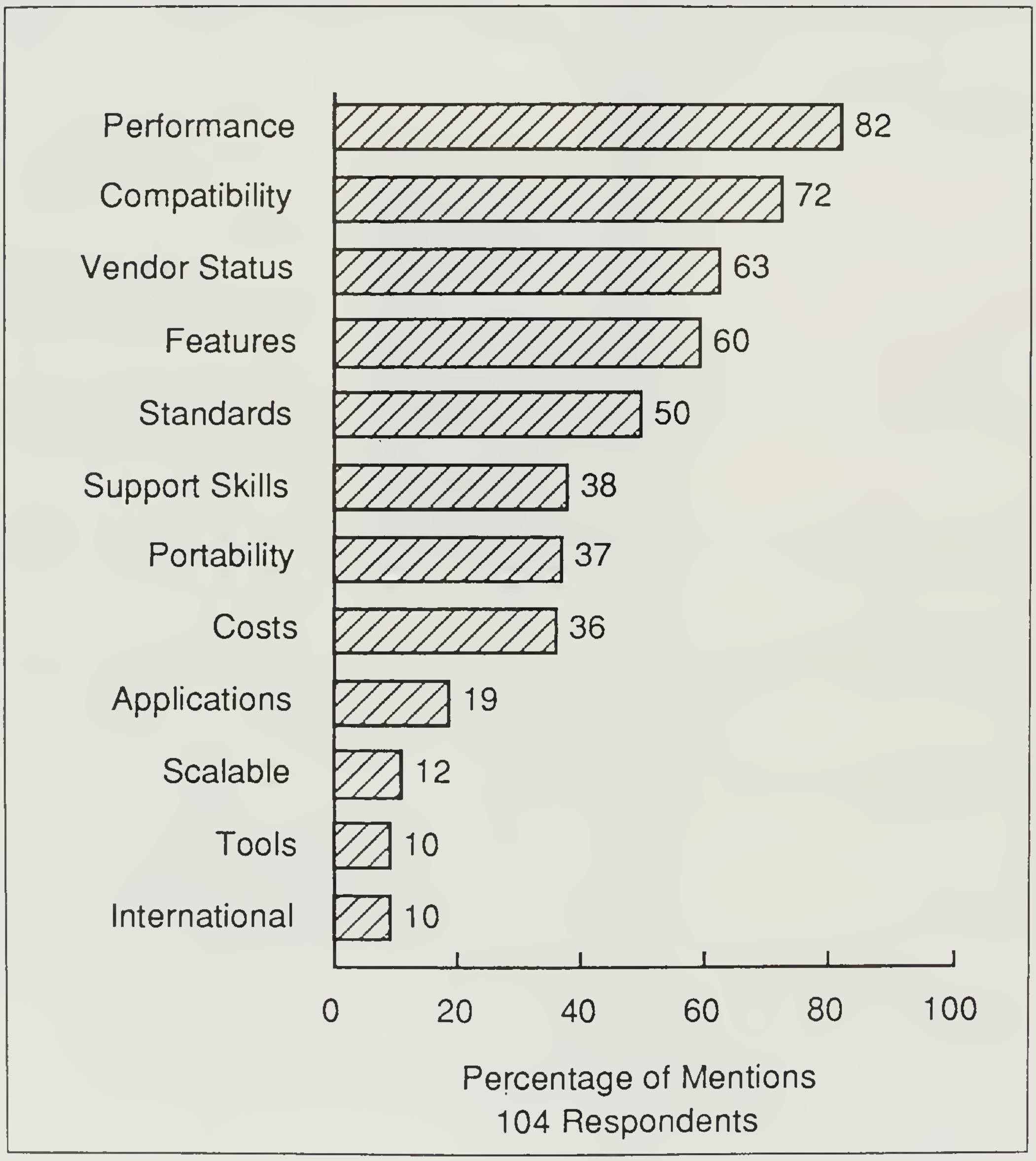


Exhibit V-5 shows the same analysis, but for respondents in the manufacturing, banking and insurance sectors only. As these industries have developed a heavy dependence on IT, they have large existing investments in databases. It is not too surprising that their top priority is the level of compatibility with older systems.

The 36% response of insurers on application packages implies that this industry is moving away from such a heavy dependence on in-house-developed, business-critical applications.

D

Migration Problems and Advice

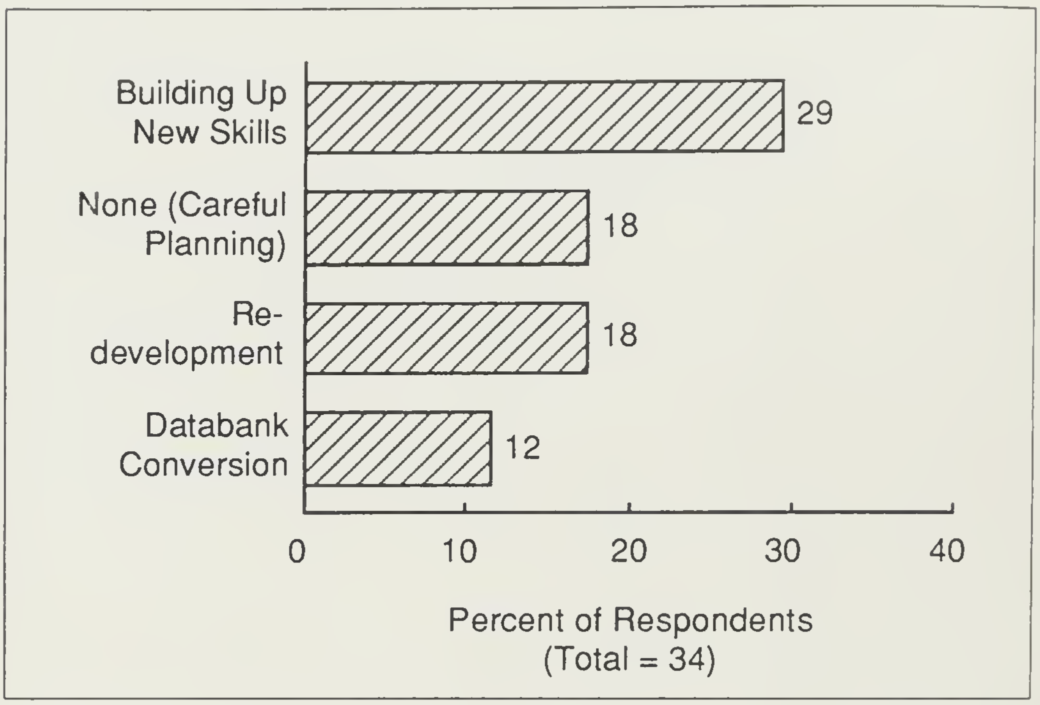
Database managers with experience in migrating to a new database technology almost speak with one voice when advising others following a similar path. "Careful analysis, very detailed planning and take your time" was the advice most often offered, as might be expected. One lone voice spoke out strongly in favour of avoiding the small-step-at-a-time route—his recommendation was to make the change as one big step. This advice has some topical relevance as many management consultants are now suggesting just such an approach to general management of process change. The problem, they say, with the step-by-step approach is that people never break their old habits. What is needed, after the detailed planning and analysis, is the short sharp shock of 'out with the old and in with the new.'

Exhibit V-6 analyses the most frequently reported problems faced by interviewees. Re-skilling emerges as the top priority. The ideal is for all staff to be re-trained before they embark on the migration project. A common mistake seems to be to start migration without attempting a pilot in order to test and develop new skills in practice with lower risk if it fails.

For some reason nearly 30% of respondents felt that they did not invest enough in training. Is this just short-sightedness? Or is it a sign that the learning curve for new technology is still very steep? Either way, these staff members are underexploiting the database technology they have purchased, and will be slower to develop new applications and increase their use.

EXHIBIT V-6

RDBMS Migration Problems



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